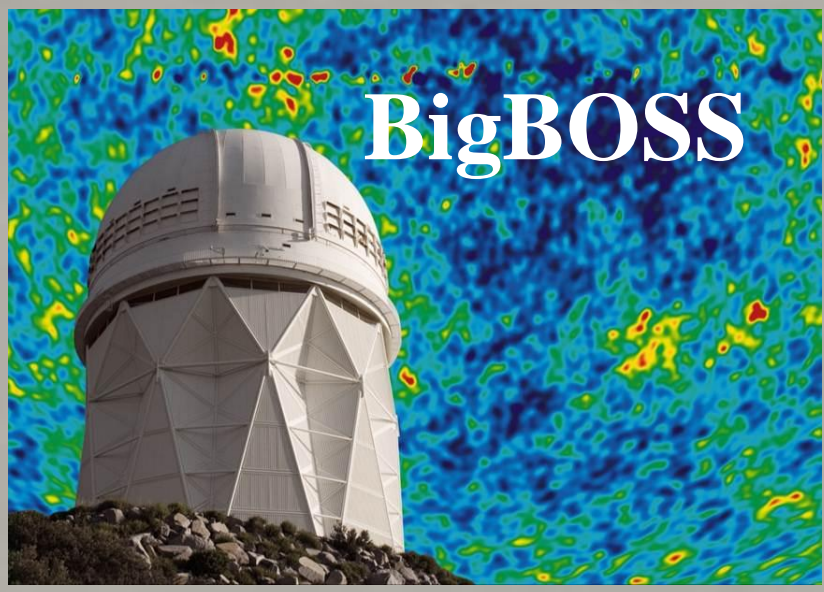
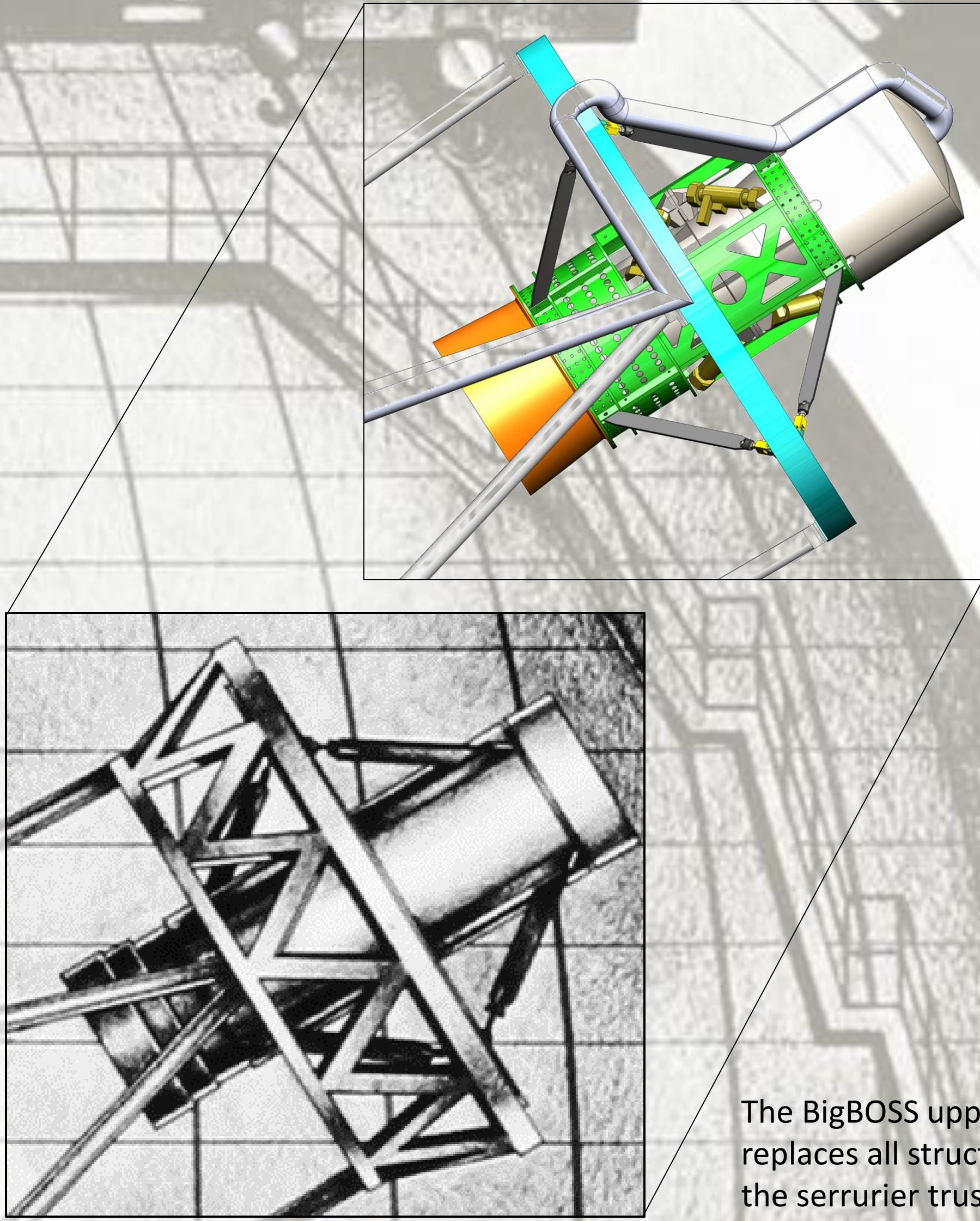
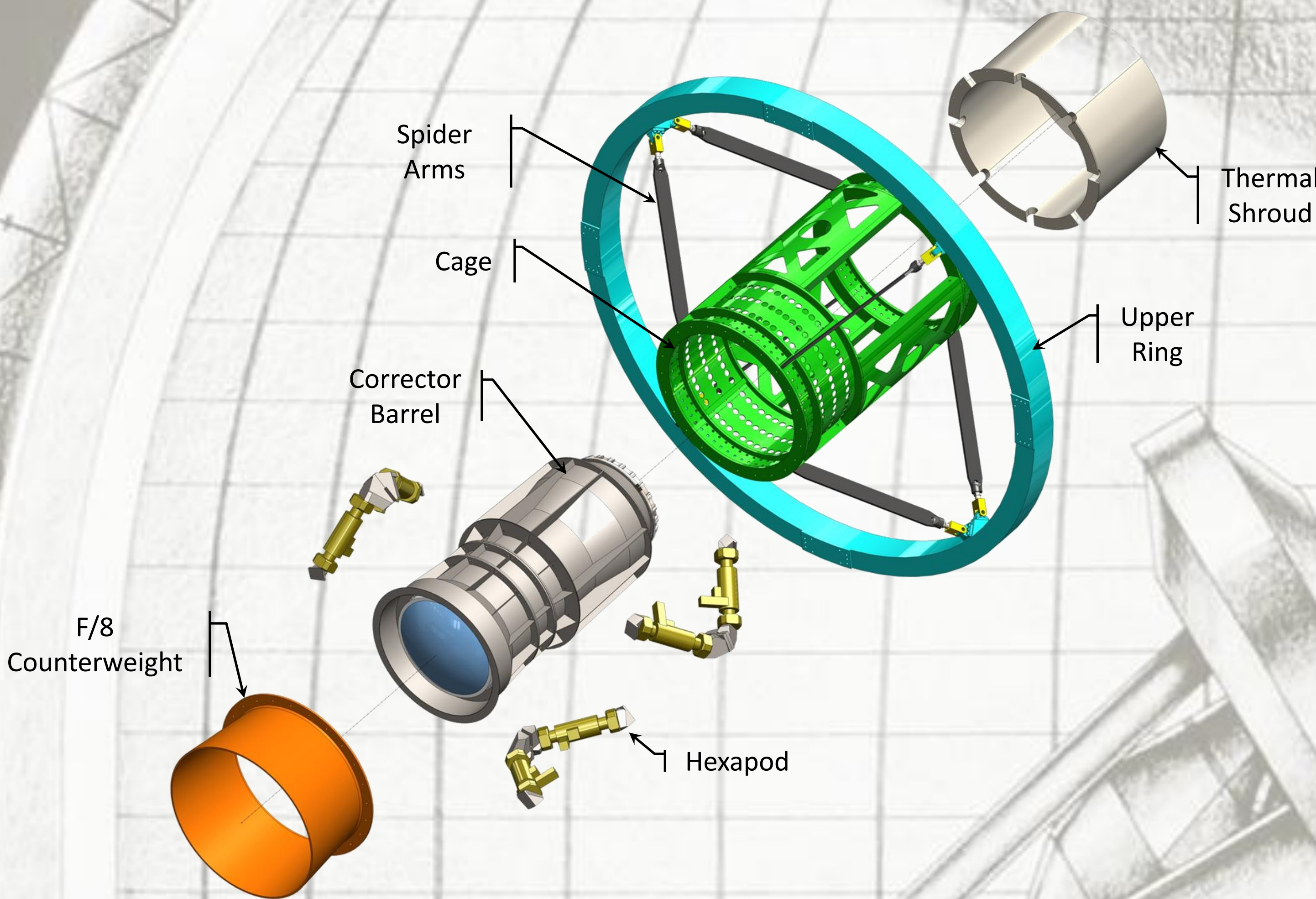


# Thermo-Mechanical Design of the BigBOSS Prime Focus Corrector



Paul Perry<sup>1</sup>, M. Azzaro<sup>3</sup>, C. Bebek<sup>1</sup>, R. Besuner<sup>2</sup>, S. Becerril<sup>3</sup>, P. Doel<sup>4</sup>, J. Edelstein<sup>2</sup>, P. Jelinsky<sup>2</sup>, R. Lafever<sup>1</sup>, F. Prada<sup>3</sup>, C. Schenk<sup>2</sup>, M. Sholl<sup>2</sup>, J. Silber<sup>1</sup>, for the BigBOSS Collaboration  
<sup>1</sup>LBNL, <sup>2</sup>UC Berkeley Space Sciences Laboratory, <sup>3</sup>Instituto de Astrofísica de Andalucía (IAA-CSIC), <sup>4</sup>University College London

The proposed BigBOSS instrument includes a new wide field prime focus corrector and fiber-fed spectrograph for the Mayall 4m telescope at Kitt Peak National Observatory. Five thousand robotically positioned fibers at the Ø0.95m focal plate feed spectrographs that measure the redshift of 20 million galaxies, surveying 10-20 times the volume of existing studies. To achieve the throughput requirements for this survey the prime focus instrument must maintain tight tolerances on alignment and distortion. These tolerances are met though stiffness and thermal design balanced against mass and volume constraints on the existing Mayall telescope structure. We present the mechanical design of the prime focus corrector, describe its components, and show system deflection and thermal distortion predictions.



The BigBOSS upper assembly replaces all structure above the serrurier truss struts.

## Prime Focus Corrector

The Prime Focus Corrector delivers a 3° field of view to fiber tips on a spherical focal surface. The upper assembly must be within the mass limits of the existing Mayall telescope structure, fit within a 1.8m obscuration, maintain f/8 mirror interchangeability, and contain thermal seeing degradation.

## Corrector Barrel

The corrector barrel moves on a hexapod to correct alignment and focus. The barrel consists of 5 steel segments that support the optical corrector elements, rotating ADC prisms, and focal plate. The structure must maintain optical alignment after integration under gravitational, dynamic, thermal loads.

## Focal Plate

The Focal Plate houses the 5000 actuators that individually position the fiber tips on a spherical focal surface. The plate must maintain the focal surface figure within 20µm in all gravity orientations and under thermal loads from actuators, guiders, and services.

